Calculation of porosity of sample described in Example 1 of patent US 4613535

Given in example 1:

Weight % Fiber: Φ_f 0.727

Areal density of pressed plate: (AD) AD 8.53 kg/m^2 Thickness of pressed plate T 0.36 inch = 0.00914 m

Densities of constituents:

 PE fiber
 ρ_{PE} 975 kg/m³

 Kraton D1107
 ρ_{KR} 940 kg/m³

Density of composition without voids:

 $\rho_{NO_VOID} = 1/(\Phi_f/\rho_{PE} + (1-\Phi_f)/\rho_{KR}) = 965.2 \text{ kg/m}^3$

True density of composition in example 1:

 $\rho_{TRUE} = AD/T = 932.9 \text{ kg/m}^3$

Porosity of composition in example 1:

 $\rho_{NO_VOID}/\rho_{TRUE} - 1 = 0.0335 = 3.35\%$



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Product specification sheet: technical information

General information

Product:	Stamylex - dense polyethylene film
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Description:

Application:

Typical properties:

Note:

Page

Technical data (typical values)

Property		T	ypical value
Thickness		0.007	mm
Weight		6.5	g/m²
Elmendorf tear resistance (ASTM D1922)	TD	70	g/μ

MD = machine direction TD = transversal direction

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- Product Data Sheet -

Solupor®: 3P07A

Microporous Polyethylene Film

Features

Thin, highly porous film with high pore size.

Applications

Substrate film for composite membranes (example: PEMFC)

Chemical Composition

Polymer (Ultra) High Molecular Weight Polyethylene

General Properties

	Value	Unit	Test Method
Total Weight per Surface Area	3.0	g/m²	MV 001
Thickness	20	μm	MV 002
Porosity	83	%	MV 001
Air Permeability, Gurley number	1.4	s/50 ml	MV 006
Mean Flow Pore Size	0.7	μm	MV 003

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	Value	Unit	Test Method
Tensile Strength @ Machine Direction	12	MPa	MV 010
Elongation at Break @ Machine Direction	13	%	MV 010
Dimensional Changes @ 80 °C			
 Machine Direction 	< 2	%	MV 009
 Transverse Direction 	< 3	%	MV 009

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